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Titel: The Barendrecht CO₂ storage project – Objectives, technical challenges, safety, project scope and public acceptance

Presentation Summary

The Barendrecht CO₂ storage project aims to permanently store pure CO₂ from the Shell Nederland Raffinaderij at Pernis in two depleted gasfields Barendrecht (phase 1, three years injection, 1700 meter depth) and Barendrecht-Ziedewij (phase 2, 25 yrs injection, 2700 meter depth). The project will result in a reduction of CO₂ emissions by the refinery with some 0.4 million tonnes per year. The current CO₂ emission by the refinery is about 4.5 million tonnes per year. In total 10 million tonnes of CO₂ will be stored. The surface facilities required for the project comprise of 2 compressor stations, a 20 kilometer long pipeline and several injection- and monitoringwells (currently gas wells, re-used for the project).

In 2008, the ministry of VROM launched a tender for CCS projects in the Netherlands. End 2008, the Ministry of VROM granted a financial Government contribution to Shell for the Barendrecht CO₂ storage project. End April 2009 the independent EIA (MER) committee concluded that the EIA (MER) of the Barendrecht CO₂ storage project provided sufficient information to enable concession of permits and to conclude that the project meets the strict safety standards applicable. In June 2009 the Municipality of Barendrecht voted against CO₂ storage in Barendrecht. On the 18th of November 2009 the Ministers of Environment and Economic affairs decided that the project could go ahead, based on all information available.

To secure and realize safe storage of CO₂ and to operate the facilities for CO₂ compression, transport and injection safely, a thorough and solid risk analysis has been executed. This analysis has resulted in the execution of various technical studies (using external expertise) on the basis of defined risk scenarios, mitigation measures and definition of the project scope.

The key points of attention for geological CO₂ storage in a depleted gas field are the well integrity, cap rock integrity, injection flow and final storage pressure, geochemical interactions, natural faults and overburden formations and layers. For these points, distinction was made between short and long term scenarios. For surface facilities phase changes of CO₂, release scenarios and materials are key points of attention.

An extensive monitoring & surveillance plan and protocol have been defined, in order to confirm on a regular basis the safe injection and storage of CO₂.

Currently the most important challenges for the project exist in the area of public acceptance, legal procedures including permit concession and procedures and long term liabilities.

The Barendrecht CO₂ storage is a demonstration project, that will set the example for future CCS projects, both onshore and offshore.

For more recent background information the project website can be visited:

www.shell.nl/co2opslag

CV abstract of the presenter

Radboud Bisschop received his Masters degree in Chemical Engineering at the Twente University, The Netherlands, in 1998. In 1999 he joined the Nederlandse Aardolie Maatschappij B.V. (NAM) as a process engineer, where he supported the troubleshooting, operations, production optimization and emissions reduction of onshore surface gas transport and treatment facilities. In 2002 he started working in NAM's Development department as project coordinator for new developments within multi-disciplinary teams consisting of subsurface technical discipline engineers (geologists, production technologists, petrophysicist, geophysicists and reservoir engineers), surface engineers and production disciplines. Besides the identification and maturation of integrated development concepts for gas –and oil production projects he also coordinated the development plans for CO₂ storage projects of the De Lier –and Barendrecht/ Barendrecht-Ziedewij fields. Since 2008 Radboud works as a project manager, responsible for project execution of gas production projects and the Barendrecht CO₂ storage project. This project will be executed under the responsibility of Shell CO₂ Storage B.V.